Clinical Review

Sternoclavicular Bacterial Arthritis

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Bacterial infection of the sternoclavicular joint is an unusual event, with cases being reported in those with diabetes mellitus, in intravenous drug abusers, and in patients afflicted with rheumatoid arthritis. A case of this unique infection occurred in a person not known to be at risk for septic arthritis. Our report shows the difficulty in diagnosing this disorder.

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Septic arthritis is a relatively uncommon occurrence. In a large, hospital-based study from 1958 to 1967, Kelly reported only 78 cases occurring in the nine years.[1] Others have confirmed the relative infrequency of this infection in subsequent series.[2,3] Although the knee and hip are the most commonly involved joints, bacterial infection limited to involvement of the sternoclavicular joint does occur, but rarely,[2-5] with most reports being described in intravenous drug abusers[6-8] and among patients afflicted with rheumatoid arthritis.[1,9-13] Some authors even claim rheumatoid patients to have a predilection to sternoclavicular joint infection, suggesting an increased risk in the absence of intra-articular or systemic steroid therapy.[10,13,14]

Sternoclavicular septic arthritis is rare in healthy patients. In an extensive literature review, we found only one case of documented sternoclavicular septic arthritis reported in a previously healthy patient in association with a tooth extraction.[15] Five other cases of this infection have been reported in persons with diabetes mellitus[4-5,16]; evidence suggests, however, that a decreased phagocytic response may predispose to bacterial infections in such patients.[17]

We report a case of documented infection of the sternoclavicular joint occurring in a patient not known to be at risk for septic arthritis. This case shows the difficulty of making the diagnosis of sternoclavicular joint infection and the consequences of delayed treatment in this life-threatening infection. A physician must maintain a high index of suspicion in any patient presenting with swelling and tenderness around the sternoclavicular joint associated with fever and signs of septic shock.

Report of a Case

The patient, a 61-year-old active and robust man, was seen in the outpatient clinic because of a two-day history of left shoulder pain, fever, and generalized lethargy. A chest x-ray film showed a patchy infiltrate in the region of the left upper lobe (Figure 1). The patient was given ampicillin for presumed pneumonia and told to return if symptoms did not improve. He returned two days later with increasing fever and episodic, shaking chills. His medical history was remarkable only for hypertension that was well controlled. He also had mitral valve prolapse diagnosed by echocardiogram in the past but was asymptomatic.

The patient was admitted to the hospital for evaluation of his left upper lobe mass and a regimen of cefazolin and gentamicin sulfate started for the treatment of pneumonia. A bronchoscopy done on the day following admission was normal. On the second day of admission the patient decompensated, with hypotension and respiratory failure developing, requiring intubation. Large volumes of fluid and the intravenous administration of pressor agents were required to maintain the blood pressure. The cardiac output was 11.7 liters per minute, systemic vascular resistance was 260 dynes per sec per cm^{-5}, and the calculated oxygen extraction was 15%, all consistent with septic shock. At this time, bilateral swelling of the neck and facial plethora developed, suggesting superior vena caval obstruction. Chest films revealed an extensive left pleural effusion with opacification of the left hemithorax. A computed tomographic (CT) scan of the chest showed a large amount of fluid extending posteriorly along the entire left lung with compression of the left lower lobe. At this time blood cultures grew *Staphylococcus aureus* in three out of four bottles. The antibiotic therapy was changed to nafcillin sodium and cefotaxime sodium. A surgeon was consulted, and a chest tube was inserted to drain a suspected empyema. Two liters of light tan, clear fluid consistent with a transudate were drained; cultures were negative.

On day 4 the patient was weaned off pressors, the endotracheal tube removed and his condition stabilized, but he had a persistent low-grade fever. Feeling that a source of infection was still present, a CT scan of the neck was recommended by an ear, nose, and throat specialist and showed soft tissue swelling with the loss of tissue planes in the region of the left sternoclavicular joint (Figure 2). A bone scan was also abnormal in the region of the left sternoclavicular joint and the first rib.

A presumptive diagnosis of sternoclavicular joint infection was made, and it was thought necessary to take the patient to surgery. Purulent material was found leaking from the left sternoclavicular joint with contiguous spread to the left anterior chest wall. The anterior mediastinum was also explored and found to contain necrotic material and pus. Cultures were taken, the wound was irrigated, and a drain was left in the mediastinum. All cultures grew *S aureus.* The patient made an excellent recovery, became afebrile, and his leukocyte count gradually decreased to normal coincident with a slow clearing of the infiltrate in the area of the left upper lobe.

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Discussion

In general, most cases of septic arthritis present with joint pain and swelling, with fever being variable and occurring in 30% to 60% of patients.[1] On the contrary, sternoclavicular septic arthritis, an uncommon infection, has no typical presentation. Often the progression of infection is insidious, delaying a diagnosis until anterior chest pain, shoulder discomfort, joint swelling, and fever become the primary complaints, as shown by the case reported herein.[6,8] Infection of the sternoclavicular joint, however, can also present acutely with high fever, bacteremia, and septic shock dominating the clinical complex.[5] Perhaps the anatomic proximity of the sternoclavicular joint to the great vessels facilitates rapid bacteremia, leading to septic shock and obtundation before signs and symptoms of joint infection become clinically apparent.

Although joint fluid aspiration with a positive identification of a pathogen is the mainstay of a diagnosis of septic arthritis, successfully obtaining fluid from the sternoclavicular joint is technically difficult and nondiagnostic in most cases.[18] As a result, relying on noninvasive techniques to make the diagnosis becomes necessary but has technical limitations. Plain roentgenograms of the chest are insensitive for detecting bony changes in the sternoclavicular joint for several reasons. First, they are difficult to visualize in the anteroposterior projection because of overlapping bones and soft tissue densities. In addition, radiographic changes suggesting osteomyelitis are a late finding and are not initially present in most cases.[2,5] Standard tomography is often not helpful as it is time-consuming and costly.[19] Computed tomography has been advocated as a superior method for providing an anatomic image of the sternoclavicular joint area.[19] It provides a much sharper image of the soft tissues and fascial planes and clear images of the bones and joints so that even small erosions can be seen.[19] This is shown in our case, in which a CT scan was instrumental in suggesting the diagnosis, and an aggressive surgical approach facilitated documenting and identifying the infection.

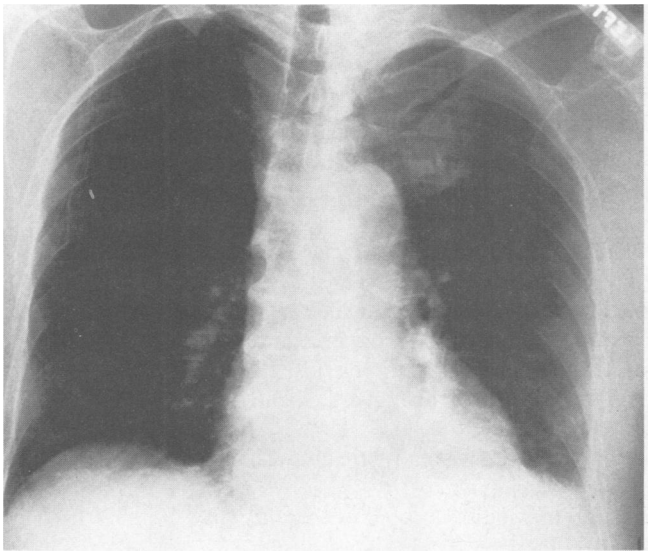

Figure 1.—A chest film done two days before admission shows a left upper lobe infiltrate.

Several unexpected findings associated with sternoclavicular joint infection deserve mention. Our patient had suppurative mediastinitis manifested by the superior vena caval syndrome early in his course. This caused confusion regarding the diagnosis, which led to bronchoscopy to look for a mass lesion. The superior vena caval syndrome has been well described in association with mediastinitis,[20(p933)] but we can find no other reports in the literature of this complication associated with sternoclavicular infection. A pleural effusion also developed in this patient that was consistent with a transudative process. This complication could be explained on the basis of associated mediastinitis causing obstruction of lymphatic and venous outflow, which has been previously reported.[21] It is surprising that these complications have not been noted in prior cases, given the anatomic proximity of the superior mediastinum and the great veins to the sternoclavicular joint.

Finally, Linscheid and co-workers reported the cases of two patients, both of whom had left upper lobe infiltrates on presentation.[5] The etiology of this is unclear, but it perhaps represents contiguous spread of infection from adjacent soft tissues resulting in a pneumonitis, as suggested by our patient, who had severe gas exchange abnormalities requiring ventilatory support.

In summary, sternoclavicular septic arthritis, albeit a rare occurrence, may present with a host of varying signs and symptoms related to the joint's anatomic proximity to the mediastinum, pleural cavity, chest wall, and great vessels. Physicians should maintain a high index of suspicion for this infection in any patient who presents with pain and swelling around the sternoclavicular joint or anterior chest wall. Supe-

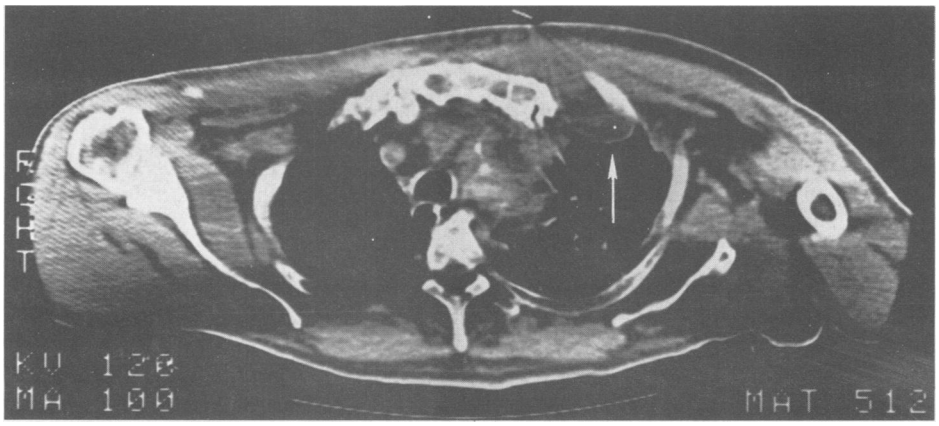

Figure 2.—A computed tomographic scan at the level of the sternoclavicular joint shows a mass extending posteriorly **(arrow)**, with anterior chest wall swelling and an inflammatory process of the mediastinum causing tracheal deviation.

rior vena caval obstruction may complicate the clinical picture due to mediastinitis from contiguous spread of infection. A timely diagnosis should be made with the aid of computed tomography, joint aspiration, and surgical exploration, if needed. Septic shock may develop quite rapidly, as shown by the high incidence of bacteremia associated with this syndrome.

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Alzheimer's Disease

PART OF THE REASON we do evaluations for Alzheimer's disease is because of reversible causes of dementia, and it is estimated that between 10% and 25% of those people presenting with cognitive decline *will* have a reversible component to their disease.

There is a long list of reversible causes of dementia. Drug toxicity probably leads the list, and, remember, all drugs may be psychoactive in the elderly. The big culprits are the sedative hypnotics, especially those longer-acting ones like Valium, Librium, and Dalmane. If you consider the cholinergic hypothesis of dementia, you can understand why anticholinergic medications—which are ubiquitous and found in over-the-counter cold remedies, sleeping pills like Benadryl, tricyclic antidepressants, and the antipsychotics we give demented old people—may, in fact, make them more confused.

Many medical diseases—hypo- and hyperthyroidism, for instance—are important to exclude.

Structural diseases such as subdural hematoma and meningioma: both of these usually have focal neurologic findings but may not.

Neurosyphilis has not been eradicated, and we still see patients with this disease. B12 and folate deficiency probably cause dementia.

There is also a disease known as normal pressure hydrocephalus that is considerably rarer than has been spoken of recently and is sometimes reversible.

—MARK BEERS, MD

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